• $p[X = n+3] = p(BB) = \frac{n}{n+3} \cdot \frac{3}{n+3} = \frac{3n}{(n+3)^2}$

x_i	$n+1$	$n+2$	$n+3$
p_i	$\frac{3n}{(n+3)^2}$	$\frac{n^2+9}{(n+3)^2}$	$\frac{3n}{(n+3)^2}$

On a : $\sum p_i = 1$.

b) $E(X) = \sum x_i p_i = \frac{3n(n+1)+(n+2)(n^2+9)+3n(n+3)}{(n+3)^2}$

$= \frac{3n(2n+4)+(n+2)(n^2+9)}{(n+3)^2} = \frac{(n+2)[n^2+6n+9]}{(n+3)^2}$

$= \frac{(n+2)(n+3)^2}{(n+3)^2} = n+2$

c) $E(X) \geq 5{,}6 \Leftrightarrow n+2 \geq 5{,}6 \Leftrightarrow n \geq 3{,}6$ d'où $n \in \mathbf{N} \setminus \{0, 1, 2, 3\}$

Solution 18 :

1°/ On a par définition $\begin{cases} p(0 \leq X \leq 20) = 1 \\ p(a \leq X \leq b) = \frac{b-a}{20} \end{cases}$

d'où $p(X < 2) = p(0 < X < 2) = \frac{2}{20} = 0{,}1$

$p(2 < X < 12) = \frac{12-2}{20} = 0{,}5$

$p(X > 15) = 1 - p(X \leq 15) = 1 - \frac{15}{20} = \frac{1}{4} = 0{,}25$

2°/ $p(X < 10 \mid X > 5) = \frac{p(5 < X < 10)}{p(X > 5)} = \frac{\frac{10-5}{20}}{1-\frac{5}{20}} = \frac{5}{15} = \frac{1}{3}$